

Solve the following system of equations:

1. $3x + 4y = -4$ ①

$x + 2y = 2$ ②

② $x + 2y = 2$

$x = -2y + 2$

① $3(-2y + 2) + 4y = -4$

$-6y + 6 + 4y = -4$

$-2y + 6 = -4$

$-2y = -10$

$y = 5$

② $x + 2y = 2$

$x + 2(5) = 2$

$x + 10 = 2$

$x = -8$

$(-8, 5)$

Check

LS	RS
$-8 + 2(5)$	2
$-8 + 10$	
$= 2$	✓

LS	RS
$3(-8) + 4(5)$	-4
$= -24 + 20$	
$= -4$	✓

Steps

- ① Number the equations.
- ② Choose equation that looks easiest to solve for 1 variable.
- ③ Choose easiest variable to solve for = SOLVE!
- ④ Substitute expression into other expressions for that variable.
- ⑤ Simplify and solve.
- ⑥ Substitute value into either equation to find other variable.
- ⑦ Write point.
- ⑧ Check LS RS

$$\begin{aligned} 2. \quad 5x - 3y &= 18 \quad (1) \\ 4x - 6y &= 18 \quad (2) \end{aligned}$$

Step 1: Number each equation. Solve one of the equations for either $x =$ or $y =$. (similar to solving for $y = mx + b$. Choose the equation that's easiest to solve in this way. Might involve moving terms from one side to another. Might involve multiplying or dividing all terms by the coefficient of the variable you're solving for. denominator You might have fractions.)

$$\begin{aligned} (2) \quad 4x - 6y &= 18 \\ -6y &= -4x + 18 \\ y &= \frac{2}{3}x - 3 \end{aligned}$$

Step 2: Substitute the solution from step 1 into the ^{other} second equation.

$$(1) \quad 5x - 3\left(\frac{2}{3}x - 3\right) = 18$$

Step 3: Solve this new equation

$$\begin{aligned} 5x - 3\left(\frac{2}{3}x\right) - 3(-3) &= 18 \\ 5x - 2x + 9 &= 18 \\ 3x + 9 &= 18 \\ 3x &= 9 \\ x &= 3 \end{aligned}$$

Step 4: Solve for the second variable

$$\begin{aligned} (1) \quad 5(3) - 3y &= 18 \\ 15 - 3y &= 18 \\ -3y &= 3 \\ y &= -1 \end{aligned}$$

The solution is: $(3, -1)$

Check it by substituting in your number for x and y into one of the equations. Compare left and right side to see if that point works -if $RS = LS$.

$$\begin{aligned} LS \\ 5(3) - 3(-1) \\ = 15 + 3 \\ = 18 \quad \checkmark \end{aligned}$$

$$\begin{aligned} RS \\ 18 \end{aligned}$$

$$\begin{aligned} LS \quad RS \\ 4(3) - 6(-1) \quad 18 \\ = 12 + 6 \\ = 18 \quad \checkmark \end{aligned}$$

Try it:

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$$\left(-\frac{23}{3}, -\frac{55}{24}\right)$$

Solve the following system of equations:

1. ① $\frac{1}{2}x - \frac{4}{5}y = -2$

② $y = \frac{1}{4}x - \frac{3}{8}$

① $\frac{1}{2}x - \frac{4}{5}\left(\frac{1}{4}x - \frac{3}{8}\right) = -2$

$$\frac{1}{2}x - \frac{4}{5}\left(\frac{1}{4}x\right) - \frac{4}{5}\left(-\frac{3}{8}\right) = -2$$

$$\frac{1}{2}x - \frac{1}{5}x + \frac{3}{10} = -2$$

$$\frac{5}{10}x - \frac{2}{10}x = -\frac{20}{10} - \frac{3}{10}$$

$$\left(\frac{10}{3}\right) \frac{3}{10}x = -\frac{23}{10}\left(\frac{10}{3}\right)$$

$$x = -\frac{23}{3}$$

① $\frac{1}{2}\left(-\frac{23}{3}\right) - \frac{4}{5}y = -2$

$$530\left(-\frac{23}{6}\right) - \left(\frac{4}{5}y\right)^{206} = (-2)(30)$$

$$\begin{array}{r} -115 \\ +115 \end{array} - 24y = -60$$

$$\begin{array}{r} -24y = 55 \\ -24 \end{array}$$

$$y = -\frac{55}{24}$$

$$\left(-\frac{23}{3}, -\frac{55}{24}\right)$$

$$\left(\frac{1}{6}, -\frac{13}{8}\right)$$

$$2. \textcircled{1} \frac{1}{2}x + \frac{2}{3}y = -1$$

$$\textcircled{2} y = \frac{1}{4}x - \frac{5}{3}$$

see
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for 2
methods

$$\textcircled{1} \frac{1}{2}x + \frac{2}{3}\left(\frac{1}{4}x - \frac{5}{3}\right) = -1$$

$$\frac{1}{2}x + \frac{2}{3}\left(\frac{1}{4}x\right) + \frac{2}{3}\left(-\frac{5}{3}\right) = -1$$

$$\frac{1}{2}x + \frac{1}{6}x - \frac{10}{9} = -1$$

$$\frac{3}{6}x + \frac{1}{6}x = -\frac{9}{9} + \frac{10}{9}$$

$$\left(\frac{6}{9}\right) \frac{4}{6}x = \frac{1}{9}\left(\frac{8}{9}\right)$$

$$x = \frac{2}{12}$$

$$x = \frac{1}{6}$$

$$\textcircled{2} y = \frac{1}{4}\left(\frac{1}{6}\right) - \frac{5}{3}$$

$$y = \frac{1}{24} - \frac{40}{24}$$

$$y = -\frac{39}{24}$$

$$y = -\frac{13}{8}$$

$$\left(\frac{1}{6}, -\frac{13}{8}\right)$$

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